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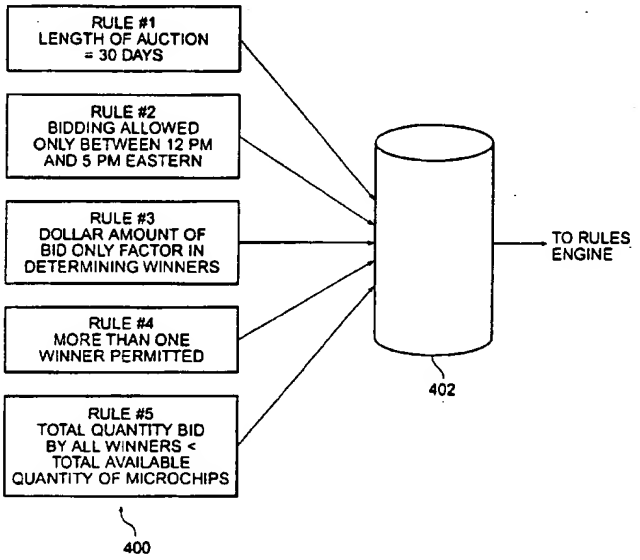
(54) Title: BUYER OR SELLER INITIATED DYNAMIC RULES DRIVEN AUCTION SYSTEM



(57) Abstract: A dynamic rules driven auction system allows for flexible parameters for online auctions. This is accomplished by providing a rules engine, which handles rules written embedded in objects. The rules for each auction have unlimited flexibility, and may be written by the initiator, or by a third party. The rules engine allows for this flexibility by receiving one or more objects from a database located on a server associated with an initiator where the one or more objects contains one or more rules defining the parameters of the online auction. The objects are loaded into a rules engine located on the server, parsed to determine the rules; and then the rules are implemented using the rules engine while executing the online auction. The execution of the online auction produces results, which are then forwarded to the database or to the initiator.

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SPECIFICATION

BUYER OR SELLER INITIATED DYNAMIC RULES DRIVEN AUCTION SYSTEM

CROSS-REFERENCE TO RELATED APPLICATIONS

The present application is a continuation-in-part of co-pending U.S. Patent Application Ser. No. 09/434,637, entitled "DYNAMIC RULES DRIVEN AUCTION SYSTEM", filed on November 4, 1999, in the name of the same inventors and commonly assigned herewith.

1. Field of the Invention.

The present invention relates to the field of on-line auctions. More specifically, the present invention relates to a system for running a buyer or seller initiated on-line auction which is driven by dynamic rules.

2. Background of the Invention.

Internet or on-line auctions have become a booming industry in recent years. These auctions allow users to place items for auctions, generally for a small listing fee and a percentage of the highest bid. The items are then available for viewing by potential customers for a fixed amount of time (different auction sites offer different length auctions, with 3-day, 5-day, 7-day, 10-day, and 14-day auctions being the most popular). During the viewing period, the potential customers may bid on the items. There are generally several different types of auctions to choose from, including a Yankee auction (e.g. one unit for sale, highest bidder wins), Dutch auction (e.g. 5 units for sale, 5 highest bidders win), and private auction (e.g. one unit for sale, highest bidder wins, but identity of bidders is kept secret).

Auction companies have a fixed set of rules for the auctions. Some of them allow for some variance in the rules within predefined criteria. For example,

at an auction site, the seller may get to choose between a 3, 5, 7, and 10-day auction, whether to have the auction be public or private, whether to have a Yankee or Dutch auction, and whether to set a reserve. Within the listing on each auction, the seller may also choose to place a photograph of the item for sale. All of these choices are predefined by the auction company, and generally apply to all sellers equally.

While this model has been successful for the selling of personal items or other low quantity, low price items, it has been less successful for auctions between businesses (also known as business-to-business web sites). Oftentimes, business may have large surpluses of goods or materials. These surpluses are generally only able to be sold to other businesses, yet finding other businesses to purchase the good or materials is sometimes a problem. The Internet provides a perfect medium for businesses to communicate regarding such purchases, but until now the use of the Internet in this field has been mainly limited to using web sites as advertising space to circulate information regarding the goods and materials to businesses across the world. Limited, business-to-business auctions have also been run, but using the exact same model as for personal goods, which does not allow for the intricacies of business-to-business sales.

This is best illustrated with an example. Company A may have a surplus of 1,000,000 microchips, which may too old to sell in the normal retail market. The company might desire to have another company simply made an extremely high offer for all 1,000,000 microchips, but it is unlikely that any company is big enough to require that many microchips. Instead, the selling company is more likely to receive bids from many different companies for smaller orders. Additionally, these bids are likely to come in from all over the United States, if not the world, which further complicates matters because shipment of business goods and materials is not as trivial as most personal purchases, where the post office or overnight service can easily deliver the goods. Company A may want the auction to go on for longer than 14 days. There are other possibilities as well,

depending on decisions made by Company A and the type of goods and potential purchasers. Perhaps Company A wants the auction to end at a specific time on a specific day, or to only allow bidding during normal business hours. Perhaps the decision on who "wins" the auction will not be made solely on the basis of who makes the highest bid, for example if location of the bidders is important, or if bidder reputation or relationships is important (maybe a long-time customer should get preferential treatment). There are an infinite number of possible "rules" that the company may which to set.

The problem with existing auction models is that they require static rules. Whatever the rules may be, the design of the auction site must explicitly provide for each and every rule. There is some freedom available, such as choosing the length of auction from a set of possible lengths, but it would be far more advantageous if there was a way to allow for a site to be designed without the need to predefine the rules. This would allow companies to easily provide their own rules, whatever they may be, for auctions. Changing the rules from auction to auction might be a desirable possibility. This would also allow an auction site to serve many different sellers, each seller having their own agenda, because it would offer the flexibility to handle the rules defined by each of the sellers, even if those rules are completely different.

3. Summary of the Invention.

A dynamic rules driven auction system allows for flexible parameters for online auctions. This is accomplished by providing a rules engine, which handles rules written embedded in objects. The rules for each auction have unlimited flexibility, and may be written by the seller, or by a third party. The rules engine allows for this flexibility by receiving one or more objects from a database located on a server associated with a seller where the one or more objects contains one or more rules defining the parameters of the online auction. The objects are loaded into a rules engine located on the server, parsed to determine the rules; and then the rules are implemented using the rules engine while executing the online

auction. The execution of the online auction produces results, which are then forwarded to the database or to the seller.

4. Brief Description of the Drawings.

FIG. 1 is a block diagram illustrating a dynamic rules-based auction system according to a first embodiment of the present invention.

FIG. 2 is a block diagram illustrating a dynamic rules-based auction system according to a second embodiment of the present invention.

FIG. 3 is a block diagram illustrating a dynamic rules-based auction system according to a third embodiment of the present invention.

FIG. 4 is a block diagram illustrating a dynamic rules-based auction system according to a fourth embodiment of the present invention.

FIG. 5 is a flow diagram illustrating a method for dynamically operating an online auction having a seller according to the first, second, or third embodiments of the present invention.

FIG. 6 is a flow diagram illustrating a method for dynamically operating an online auction having a seller according to the fourth embodiment of the present invention.

FIG. 7 is a block diagram illustrating a more detailed view of the rules engine according to the four embodiments of the present invention.

5. Detailed Description of a Preferred Embodiment.

Those of ordinary skill in the art will realize that the following description of the present invention is illustrative only and not in any way limiting. Other

embodiments of the invention will readily suggest themselves to such skilled persons after review of this disclosure.

In accordance with a presently preferred embodiment of the present invention, the components, processes and/or data structures are implemented using the Internet and server-based technology, including a C++ based engine on a server. Different implementations may be used and may include other types of programming languages, computing platforms, computer programs, firmware and/or general purpose machines. In addition, those of ordinary skill in the art will readily recognize that devices of a less general purpose nature, such as hardwired devices, devices relying on FPGA (field programmable gate array) or ASIC (Application Specific Integrated Circuit) technology, or the like, may also be used without departing from the scope and spirit of the inventive concepts disclosed herein. Additionally, while the present disclosure discusses the invention using the singular word "server", one of ordinary skill in the art will recognize that implementations are possible where the functions or components are located on multiple servers, even across large geographic distances.

In auctions, there is generally one party who initiates the auction process. In traditional auction, this is generally the seller, who places a good or service up for auction, at which point one or more buyers bid on the good or service. However, given the large variety of auction models, this initiator may not be a seller. Reverse auctions have gained in popularity in recent years so it is quite possible now to have the initiator of the auction be a potential buyer rather than a seller. Additionally, it is also conceivable that there may be auctions where there are both multiple sellers and multiple buyers participating. For purposes of this specification, the term initiator will be used to represent the party that controls the rules of the auctions. Thus, while in traditional auctions the initiator may be limited to a single buyer, for purposes of this specification, the initiator may be a buyer, a seller, or multiple buyers or sellers.

For purposes of this specification, any party participating in the auction but who is not an initiator will be termed a bidder. It follows from the previous paragraph that, while in traditional auctions the bidder will be one or more buyers, for purposes of this specification, each bidder may be a buyer or seller.

A dynamic rules-based auction system is provided which allows for the dynamic processing of rules defined by initiators. This permits a great deal of flexibility in how the system is used and is especially beneficial for business auctions, which generally require more flexibility than personal auctions. However, the present invention is not meant to be limited to business auctions and, in fact, the added flexibility allows for its use with any type of auction

FIG. 1 is a block diagram illustrating a dynamic rules-based auction system according to a first embodiment of the present invention. Rules engine 50 may be located on server 52. Also located on server 52 is a database 54. Database 54 contains records on each initiator, and corresponding rules definitions for each. Process 56, which runs the rules, is executed on server 52 and in the same process as the rules engine 50. Server 52 may be running using Windows® NT as an operating system.

FIG. 2 is a block diagram illustrating a dynamic rules-based auction system according to a second embodiment of the present invention. Rules engine 100 may be located on server 102. Also located on server 102 is a database 104. Database 104 contains records on each initiator, and corresponding rules definitions for each. Process or processes 106, which run the rules, are executed on server 102 but in a separate process or processes as engine 100. Server 102 may be running using Windows® NT as an operating system.

FIG. 3 is a block diagram illustrating a dynamic rules-based auction system according to a third embodiment of the present invention. Rules engine 150 may be located on server 152 Also located on server 152 is a database 154. Database

154 contains records on each initiator, and corresponding rules definitions for each. Process or processes 156, which run the rules, are executed on different servers 158, 160, 162, which may communicate with server 152. Server 152 may be running using Windows® NT as an operating system. Servers 158, 160, 162 may be running on a variety of possible operating systems including Windows® NT or UNIX.

FIG. 4 is a block diagram illustrating a dynamic rules-based auction system according to a fourth embodiment of the present invention. Engine 200 may be located on server 202. Database 204 is located on a different server 206. Database 204 contains records on each initiator, and corresponding rules definitions for each. Server 202 may be running using Windows® NT as an operating system, while server 206 may be running using UNIX as an operating system. Process or processes 208, which run the rules, are executed on different servers 210, 212, 214, which may communicate with server 202.

In all four embodiments, the components generally function in the same way, therefore they will be described without regard to the different embodiments. To the extent that there are differences among the different embodiments, an explanation will be provided.

The rules are written as objects. Generally, objects are used with an object-oriented computer language (such as Java or C++) but that is not a requirement. The rules are often written by the initiator, however the auction company may offer templates to allow those initiators who are inexperienced with computer programming to create rules as well. The rules may execute helper objects, they may access other servers to determine auction parameters, or they may set the auction parameters themselves. These rules may be stored in a database organized by initiator, or individual initiators may store their rules on their own servers, which may be transmitted to the auction company server at the time of the auction.

A rules engine is provided which loads rules from the database or other source on the fly. In a preferred embodiment of the present invention, this engine is written using C++. The rules engine also accepts any data which may be passed to the individual objects during the bidding process. This may include such details as the bidders ID, the time of the bid, the amount of the bid, etc. The rules engine executes the rules as need be throughout the auction. Some of the rules will affect the course or implementation of the auction (such as how long the auction is, what type of auction it is) and will have to be executed before or during the auction. Other rules will affect the final tally of the auction (such as how to determine the winner). The rules engine can then communicate the winners to the initiator's server and/or update the database.

Parallel execution of the rules is also a possibility. This would allow many auctions to be performed simultaneously or to speed up the execution of rules.

FIG. 5 is a flow diagram illustrating a method for dynamically operating an online auction having an initiator according to the first, second, or third embodiments of the present invention. At 250, one or more objects are received from a database located on a server, the one or more objects containing one or more rules, the one or more rules defining the parameters of the online auction. These rules, as discussed above, are often written by the initiator. The objects may be written using an object-oriented language, such as Java. At 252, the objects are loaded into a rules engine located on the server. Then, at 254, the rules engine parses the one or more objects to determine the rules of the auction.

At 256, the rules engine executes the rules while executing the online auction, producing results of the auction. The phrase "while executing the online auction" covers a period of time just before the auction itself, when the auction is being set-up up to and including just after the auction is completed, when the final results are calculated. Executing may involve any number of tasks according to what is defined in the rules, including launching helper objects on the server or

the initiator's server. Process or processes will generally be spawned to execute each of these rules, and the processes may be executed in parallel. In the first embodiment of the present invention, these processes are spawned in the same process as the rules engine, while in the second embodiment, they are spawned in a different process than the rules engine, but still on the same server. In the third embodiment, these processes are spawned on a different server (or servers) entirely. At 258, the results of the auction may be forwarded to a database for storage and later retrieval by the initiator.

FIG. 6 is a flow diagram illustrating a method for dynamically operating an online auction having an initiator according to the fourth embodiment of the present invention. At 300, one or more objects are received from the initiator, the one or more objects containing one or more rules, the one or more rules defining the parameters of the online auction. These rules, as discussed above, are often written by the seller. The objects may be written using an object-oriented language, such as Java. At 302, the objects are loaded into a rules engine located on the server. Then, at 304, the rules engine parses the one or more objects to determine the rules of the auction.

At 306, the rules engine executes the rules while executing the online auction, producing results of the auction. The phrase "while executing the online auction" covers a period of time just before the auction itself, when the auction is being set-up up to and including just after the auction is completed, when the final results are calculated. Executing may involve any number of tasks according to what is defined in the rules, including launching helper objects on the server or the initiator's server. Process or processes will generally be spawned to execute each of these rules, and the processes may be executed in parallel. At 308, the results of the auction may be forwarded to the initiator.

FIG. 7 is a block diagram illustrating a more detailed view of the rules engine (50 in FIG. 1, 100 in FIG. 2, 150 in FIG. 3, 200 in FIG. 4) according to

the four embodiments of the present invention. An object receiver 350 receives one or more objects from either a database located on a server, or at the initiators location, the one or more objects containing one or more rules, the one or more rules defining the parameters of the online auction. An object loader 352 loads the objects. Then, an object parser 354 parses the one or more objects to determine the rules of the auction.

A rules executor 356 then executes the rules while executing the online auction, producing results of the auction. A results forwarder 358 then forwards the results to a database for storage and later retrieval by the initiator, or directly to the initiator.

FIG. 8 is a diagram depicting an example of how this system works may be if a chip manufacturer wants to auction off 1,000,000 surplus microchips. Obviously, such an auction would be intended to attract other businesses into purchasing some or all of the microchips. In order to facilitate large companies purchasing the chips, the length of the auction is chosen to be 30 days (since large companies may take longer to decide to bid due to internal purchasing procedures). Additionally, in order to make the process fair for all companies in the United States, the initiator may wish to limit bidding so that it is only permitted during normal business working hours (Monday through Friday, 9 a.m. through 5 p.m.). Since the companies may be located throughout the United States, bidding may be further limited so that it is only permitted between 12 p.m. and 5 p.m. Eastern time, to ensure that non-East coast companies have a chance to bid while at work). The initiator may also want to choose a particular time, say 5 p.m. Eastern time, for the auction to end.

Additional rules may be implemented based on how the auction is to be run, such as allowing multiple "winners". How the winners are chose is also something that should be defined in the rules 400. Should an offer to buy 500,000

chips at $75 each be treated as a "better" bid than an offer to buy 100,000 at $75 a piece?

These rules may be created entirely by the initiator, or a template may be provided by the auction company giving "default" rules, which could then be easily modified by the initiator.

Since many of these rules are unusual for auctions, it would be very unlikely that any of them would be automatically provided as a choice to the initiator by any "normal" auction company. Through the dynamic system of the present invention, however, it is possible to provide for these "unusual" auctions.

Once these rules 400 are decided and implemented into objects, the objects are stored in the database 402. When the auction starts, rules engine retrieves the objects from the database, parses them, and executes them to properly run the auction and produce the results, which are then stored in the database 402 for later retrieval.

The foregoing description of the preferred embodiments of the present invention has been provided for the purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise forms disclosed. While embodiments and applications of this invention have been shown and described, it would be apparent to those skilled in the art after review of this disclosure that many more modifications than mentioned above are possible without departing from the inventive concepts herein. The invention, therefore, is not to be restricted except in the spirit of the appended claims.

CLAIMS

What is claimed is:

1. A method for dynamically operating an online auction having an initiator including:

loading one or more objects, said one or more objects containing one or more rules, said one or more rules defining the parameters of the online auction;

parsing said one or more objects to determine said rules; and

executing said rules using a rules engine while executing the online auction, the execution of the online auction producing results.

2. The method of claim 1, wherein said objects are written in an object-oriented language.

3. The method of claim 1, wherein said executing includes executing helper objects defined by said rules.

4. The method of claim 1, further including forwarding said results to said initiator.

5. The method of claim 1, further including forwarding said results to a database.

6. The method of claim 1, wherein said executing including spawning one or more processes for execution of said rules.

7. The method of claim 6, wherein said one or more processes run in parallel to each other.

8. The method of claim 1, wherein said initiator is a seller.

9. The method of claim 1, wherein said initiator is a buyer.

10. A method for dynamically operating an online auction having an initiator including:

receiving one or more objects from a database located on a server said one or more objects containing one or more rules, said one or more rules defining the parameters of the online auction;

loading said one or more objects into a rules engine located on said server;

parsing said one or more objects to determine said rules;

executing said rules using said rules engine while executing the online auction, the execution of the online auction producing results; and

forwarding said results to said database.

11. The method of claim 10, wherein said objects are written in an object-oriented language.

12. The method of claim 10, wherein said executing includes executing helper objects defined by said rules.

13. The method of claim 10, wherein said executing including spawning one or more processes for execution of said rules, said processes running on said server.

14. The method of claim 10, wherein said executing including spawning one or more processes for execution of said rules, said processes running on said server and in the same process as said rules engine.

15. The method of claim 13, wherein said one or more processes run in parallel to each other.

16. The method of claim 14, wherein said one or more processes run in parallel to each other.

17. The method of claim 10, wherein said executing including spawning one or more processes for execution of said rules, said processes running on a second server.

18. The method of claim 17, wherein said second server is operated by said initiator.

19. The method of claim 17, wherein said one or more processes run in parallel to each other.

20. The method of claim 18, wherein said one or more processes run in parallel to each other.

21. The method of claim 10, wherein said initiator is a seller.

22. The method of claim 10, wherein said initiator is a buyer.

23. A method for dynamically operating an online auction having an initiator including:

receiving one or more objects from the initiator, said one or more rules defining the parameters of the online auction;

loading said one or more objects into a rules engine located on said server;

parsing said one or more objects to determine said rules;

executing said rules using said rules engine while executing the online auction, the execution of the online auction producing results; and

forwarding said results to said initiator.

24. The method of claim 23, wherein said objects are written in an object-oriented language.

25. The method of claim 23, wherein said executing includes executing helper objects defined by said rules.

26. The method of claim 23, wherein said executing including spawning one or more processes for execution of said rules, said processes running on said server.

27. The method of claim 23, wherein said executing including spawning one or more processes for execution of said rules, said processes running on said server and in the same process as said rules engine.

28. The method of claim 26, wherein said one or more processes run in parallel to each other.

29. The method of claim 27, wherein said one or more processes run in parallel to each other.

30. The method of claim 23, wherein said executing including spawning one or more processes for execution of said rules, said processes running on a second server.

31. The method of claim 30, wherein said second server is operated by said initiator.

32. The method of claim 30, wherein said one or more processes run in parallel to each other.

33. The method of claim 31, wherein said one or more processes run in parallel to each other.

34. The method of claim 23, wherein said initiator is a seller.

35. The method of claim 23, wherein said initiator is a buyer.

36. A rules engine for a dynamic online auction system including:
an object receiver;
an object loader coupled to said object receiver;
an object parser coupled to said object loader; and
a rules executor coupled to said object parser.

37. The rules engine of claim 36, further including a results forwarder coupled said rules executor.

38. The rules engine of claim 37, wherein said results forwarder is coupled to a database.

39. The rules engine of claim 37, wherein said results forwarder is coupled to an initiator.

40. The rules engine of claim 36, wherein said object receiver is coupled to a database.

41. The rules engine of claim 36, wherein said object receiver is coupled to an initiator.

42. The rules engine of claim 36, wherein said rules executor is coupled to one or more servers.

43. A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform a method for dynamically operating an online auction having an initiator, the method including:

loading one or more objects, said one or more objects containing one or more rules, said one or more rules defining the parameters of the online auction;

parsing said one or more objects to determine said rules; and

executing said rules using a rules engine while executing the online auction, the execution of the online auction producing results.

44. A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform a method for dynamically operating an online auction having an initiator, the method including:

receiving one or more objects from a database located on a server said one or more objects containing one or more rules, said one or more rules defining the parameters of the online auction;

loading said one or more objects into a rules engine located on said server;

parsing said one or more objects to determine said rules;

executing said rules using said rules engine while executing the online auction, the execution of the online auction producing results; and

forwarding said results to said database.

45. A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform a method for dynamically operating an online auction having an initiator, the method including:

receiving one or more objects from the initiator, said one or more rules defining the parameters of the online auction;

loading said one or more objects into a rules engine located on said server;

parsing said one or more objects to determine said rules;

executing said rules using said rules engine while executing the online auction, the execution of the online auction producing results; and

forwarding said results to said initiator.

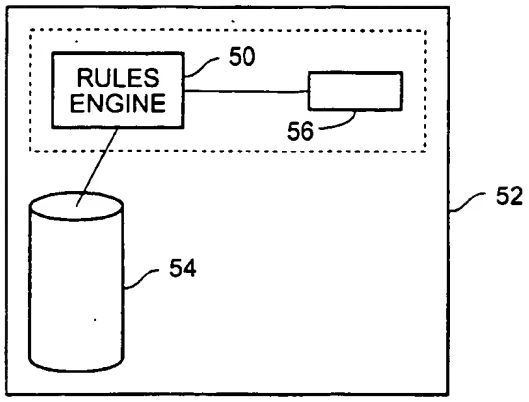

FIG. 1

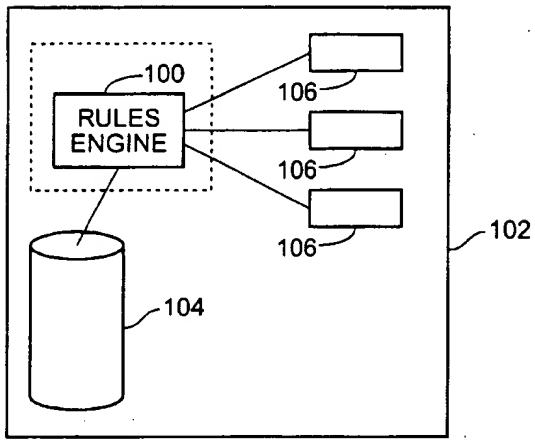

FIG. 2

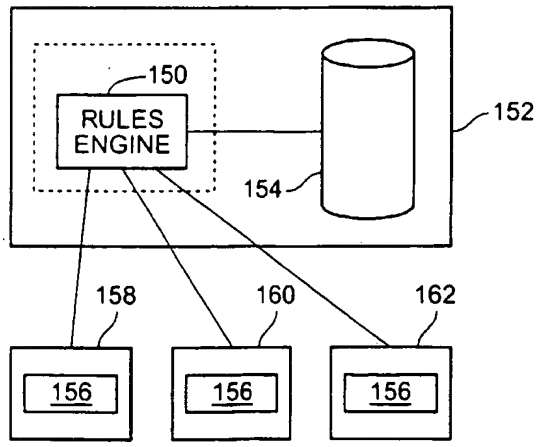

FIG. 3

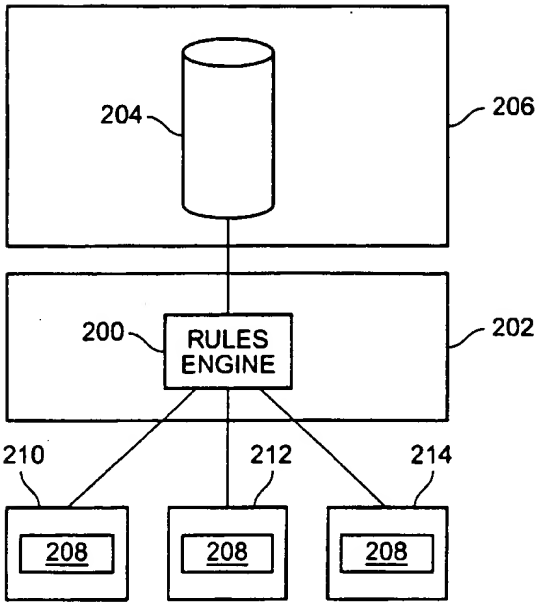
204
206
200
RULES ENGINE
202
210
212
214
208
208
208

FIG. 4

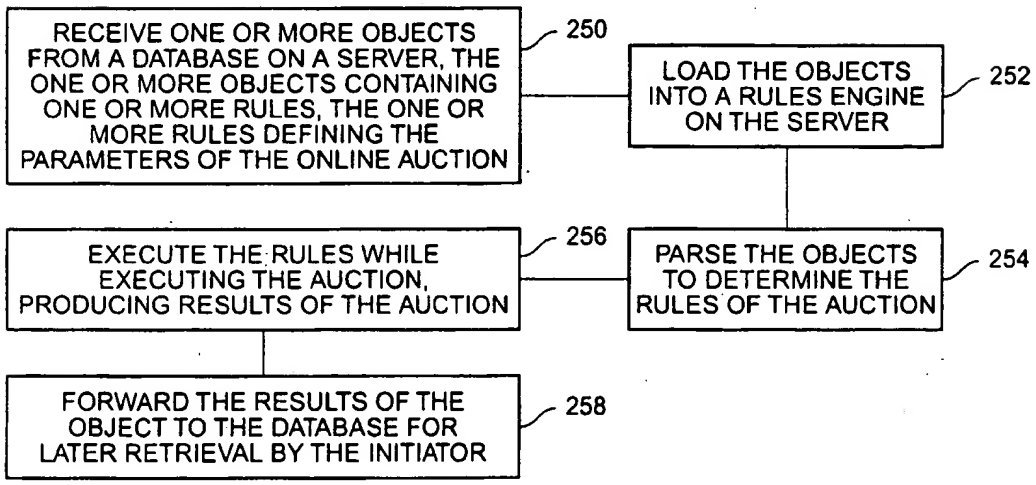
RECEIVE ONE OR MORE OBJECTS FROM A DATABASE ON A SERVER, THE ONE OR MORE OBJECTS CONTAINING ONE OR MORE RULES, THE ONE OR MORE RULES DEFINING THE PARAMETERS OF THE ONLINE AUCTION
250
LOAD THE OBJECTS INTO A RULES ENGINE ON THE SERVER
252
EXECUTE THE RULES WHILE EXECUTING THE AUCTION, PRODUCING RESULTS OF THE AUCTION
256
PARSE THE OBJECTS TO DETERMINE THE RULES OF THE AUCTION
254
FORWARD THE RESULTS OF THE OBJECT TO THE DATABASE FOR LATER RETRIEVAL BY THE INITIATOR
258

FIG. 5

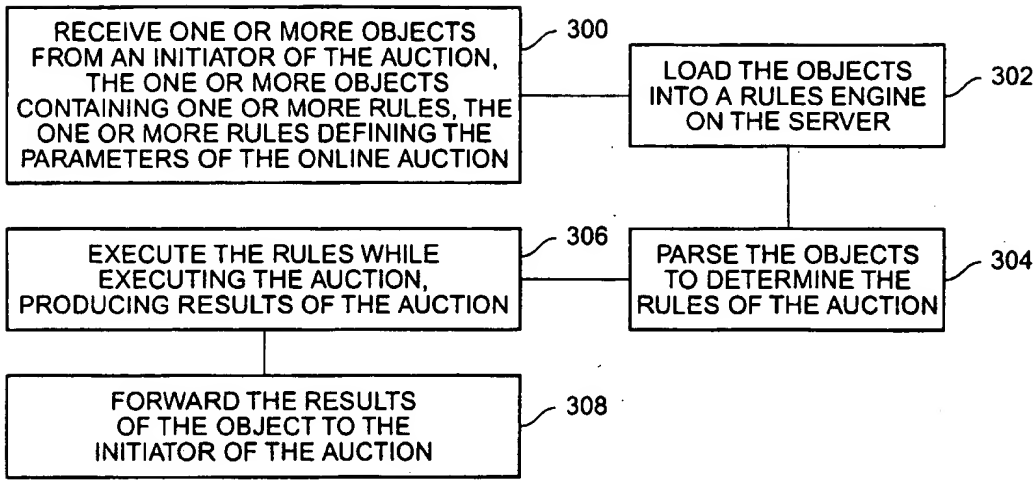
RECEIVE ONE OR MORE OBJECTS FROM AN INITIATOR OF THE AUCTION, THE ONE OR MORE OBJECTS CONTAINING ONE OR MORE RULES, THE ONE OR MORE RULES DEFINING THE PARAMETERS OF THE ONLINE AUCTION
300
LOAD THE OBJECTS INTO A RULES ENGINE ON THE SERVER
302
PARSE THE OBJECTS TO DETERMINE THE RULES OF THE AUCTION
304
EXECUTE THE RULES WHILE EXECUTING THE AUCTION, PRODUCING RESULTS OF THE AUCTION
306
FORWARD THE RESULTS OF THE OBJECT TO THE INITIATOR OF THE AUCTION
308

FIG. 6

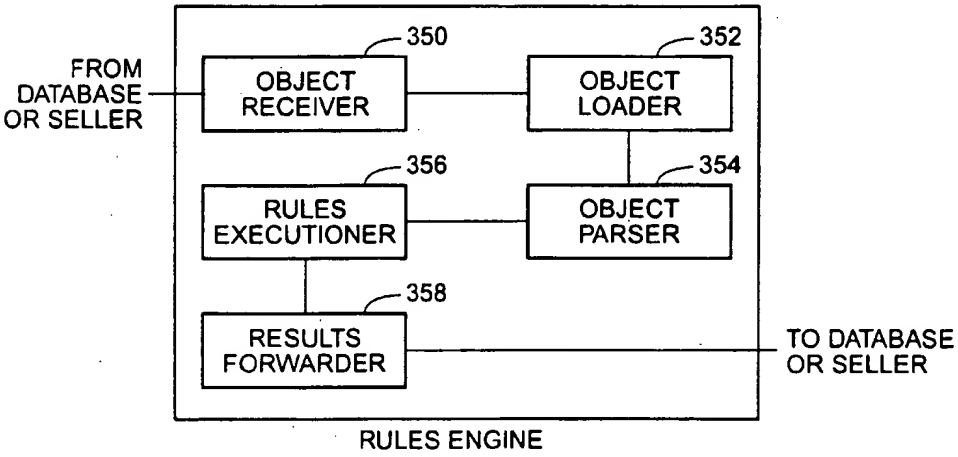
FROM DATABASE OR SELLER
OBJECT RECEIVER
350
OBJECT LOADER
352
RULES EXECUTIONER
356
OBJECT PARSER
354
RESULTS FORWARDER
358
TO DATABASE OR SELLER
RULES ENGINE

FIG. 7

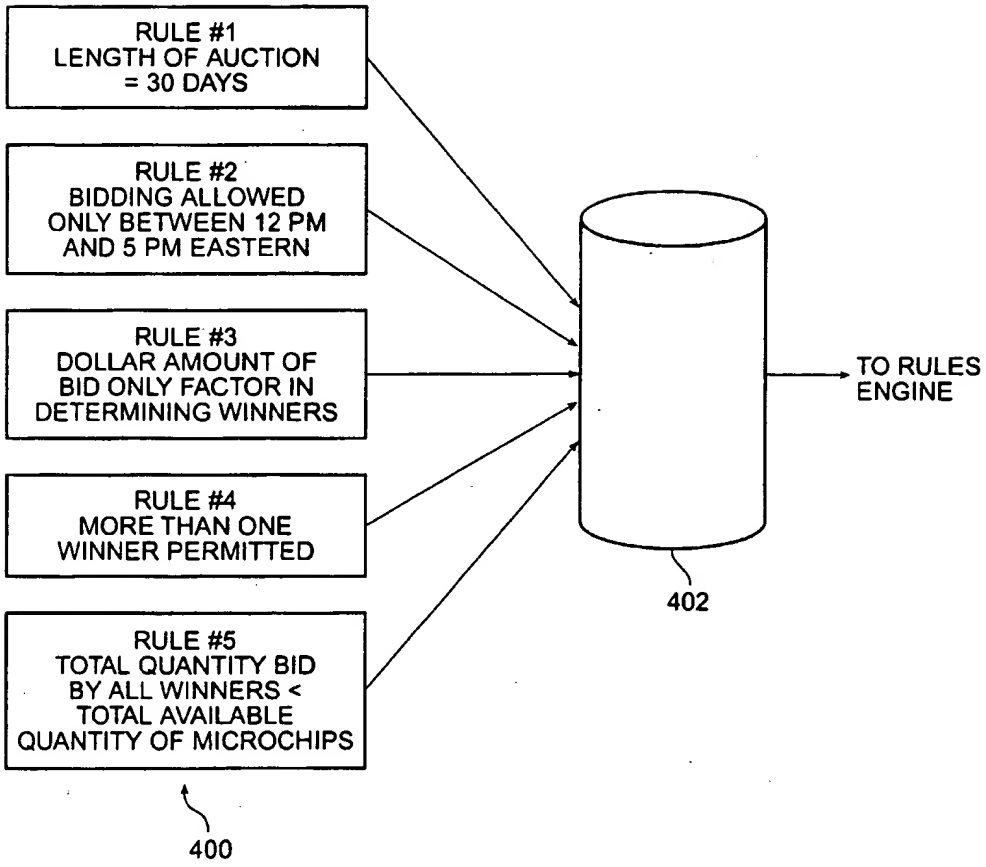
RULE #1
LENGTH OF AUCTION
= 30 DAYS
RULE #2
BIDDING ALLOWED
ONLY BETWEEN 12 PM
AND 5 PM EASTERN
RULE #3
DOLLAR AMOUNT OF
BID ONLY FACTOR IN
DETERMINING WINNERS
RULE #4
MORE THAN ONE
WINNER PERMITTED
RULE #5
TOTAL QUANTITY BID
BY ALL WINNERS <
TOTAL AVAILABLE
QUANTITY OF MICROCHIPS
400
402
TO RULES
ENGINE

FIG. 8